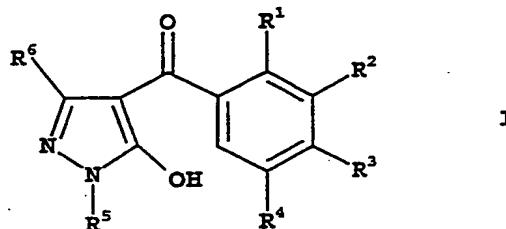


We claim:

1. A synergistic herbicidal mixture comprising

5       A) at least one 3-heterocyclyl-substituted benzoyl derivative of the formula I



10       in which the variables have the following meanings:

R<sup>1</sup>, R<sup>3</sup> are halogen, C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-haloalkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>1</sub>-C<sub>6</sub>-haloalkoxy, C<sub>1</sub>-C<sub>6</sub>-alkylthio, C<sub>1</sub>-C<sub>6</sub>-alkylsulfinyl or C<sub>1</sub>-C<sub>6</sub>-alkylsulfonyl;

15       R<sup>2</sup> is a heterocyclic radical selected from the group: isoxazol-3-yl, isoxazol-4-yl, isoxazol-5-yl, 4,5-dihydroisoxazol-3-yl, 4,5-dihydroisoxazol-4-yl and 4,5-dihydroisoxazol-5-yl, it being possible for the six radicals mentioned to be unsubstituted or mono- or polysubstituted by halogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>4</sub>-haloalkyl, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy or C<sub>1</sub>-C<sub>4</sub>-alkylthio;

25       R<sup>4</sup> is hydrogen, halogen or C<sub>1</sub>-C<sub>6</sub>-alkyl;

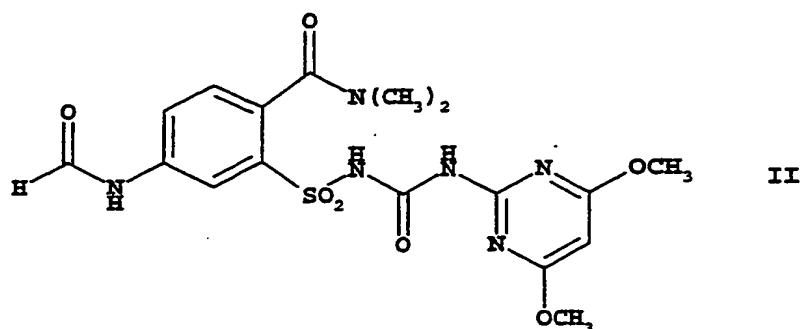
R<sup>5</sup> is C<sub>1</sub>-C<sub>6</sub>-alkyl;

R<sup>6</sup> is hydrogen or C<sub>1</sub>-C<sub>6</sub>-alkyl;

30       or one of its environmentally compatible salts;

and

B) a synergistically effective amount of the compound of formula II



5

or one of its environmentally compatible salts;

and, if desired,

10 C) at least one herbicidal compound from the group of the acetyl-CoA carboxylase inhibitors (ACC), acetolactate synthase inhibitors (ALS), amides, auxin herbicides, auxin transport inhibitors, carotenoid biosynthesis inhibitors, enolpyruvylshikimate 3-phosphate synthase inhibitors (EPSPS), glutamine synthetase inhibitors, lipid biosynthesis inhibitors, mitosis inhibitors, protoporphyrinogen IX oxidase inhibitors, photosynthesis inhibitors, synergists, growth substances, cell wall biosynthesis inhibitors and a variety of other  
 15 herbicides;

20

and, if desired,

25 D) a safening effective amount of at least one safener selected from the group of isoxadifen, mefenpyr and fenchlorazol;

or one of its environmentally compatible salts or esters.

30 2. A synergistic herbicidal mixture as claimed in claims 1, comprising, as component A), a 3-heterocyclyl-substituted benzoyl derivative of the formula I, where R<sup>4</sup> is hydrogen.

3. A synergistic herbicidal mixture as claimed in any of claims 1 to 2, comprising, as component A), a 3-heterocyclyl-substituted benzoyl derivative of the formula I, where

5 R<sup>1</sup> is halogen, C<sub>1</sub>-C<sub>6</sub>-alkyl or C<sub>1</sub>-C<sub>6</sub>-alkylsulfonyl;

R<sup>3</sup> is halogen or C<sub>1</sub>-C<sub>6</sub>-alkylsulfonyl.

10 4. A synergistic herbicidal mixture as claimed in any of claims 1 to 3, comprising, as component A), a 3-heterocyclyl-substituted benzoyl derivative of the formula I, where

15 R<sup>2</sup> is a heterocyclic radical selected from the group: isoxazol-3-yl, isoxazol-5-yl and 4,5-dihydroisoxazol-3-yl, it being possible for the three radicals mentioned to be unsubstituted or mono- or polysubstituted by halogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>4</sub>-haloalkyl, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy or C<sub>1</sub>-C<sub>4</sub>-alkylthio.

20 5. A synergistic herbicidal mixture as claimed in any of claims 1 to 4, comprising, as component A), a 3-heterocyclyl-substituted benzoyl derivative of the formula I, where

25 R<sup>2</sup> is isoxazol-5-yl, 3-methyl-isoxazol-5-yl, 4,5-dihydroisoxazol-3-yl, 5-methyl-4,5-dihydroisoxazol-3-yl, 5-ethyl-4,5-dihydroisoxazol-3-yl or 4,5-dimethyl-4,5-dihydroisoxazol-3-yl.

30 6. A synergistic herbicidal mixture as claimed in any of claims 1 to 5, comprising, as component A), 4-[2-chloro-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole.

35 7. A synergistic herbicidal mixture as claimed in any of claims 1 to 5, comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole.

40 8. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising, two active ingredients, a 3-heterocyclyl-

substituted benzoyl derivative of the formula I (component A) as claimed in claims 1 to 7 and the compound of formula II (component B).

5 9. A synergistic herbicidal mixture as claimed in claim 8, comprising as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole and as component B) the compound of formula II.

10 10. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising, at least three active ingredients, a 3-heterocyclyl-substituted benzoyl derivative of the formula I (component A) as claimed in claims 1 to 7, the compound of formula II (component B) and

15 C) at least one herbicidal compound from the group of the acetyl-CoA carboxylase inhibitors (ACC), acetolactate synthase inhibitors (ALS), amides, auxin herbicides, auxin transport inhibitors, carotenoid biosynthesis inhibitors, enolpyruvylshikimate 3-phosphate synthase inhibitors (EPSPS), glutamine synthetase inhibitors, lipid biosynthesis inhibitors, mitosis inhibitors, protoporphyrinogen IX oxidase inhibitors, photosynthesis inhibitors, synergists, growth substances, cell wall biosynthesis inhibitors and a variety of other herbicides.

20 25 30 35 40

11. A synergistic herbicidal mixture as claimed in claim 1 or 10 comprising, as component C), at least one herbicidal compound from the groups C1 to C16:

C1 acetyl-CoA carboxylase inhibitors (ACC): cyclohexenone oxime ethers, phenoxyphenoxypropionic esters or arylaminopropionic acids;

C2 acetolactate synthase inhibitors (ALS): imidazolinones, pyrimidyl ethers, sulfonamides or sulfonylureas;

C3 amides;

C4 auxin herbicides:  
pyridinecarboxylic acids, 2,4-D or benazolin;

5 C5 auxin transport inhibitors;

C6 carotenoid biosynthesis inhibitors;

10 C7 enolpyruvylshikimate 3-phosphate synthase inhibitors  
(EPSPS);

C8 glutamine synthetase inhibitors;

15 C9 lipid biosynthesis inhibitors:  
anilides, chloroacetanilides, thioureas, benfuresate or  
perfluidone;

C10 mitosis inhibitors:  
carbamates, dinitroanilines, pyridines, butamifos,  
20 chlorthal-dimethyl (DCPA) or maleic hydrazide;

C11 protoporphyrinogen IX oxidase inhibitors:  
diphenyl ethers, oxadiazoles, cyclic imides or pyrazoles;

25 C12 photosynthesis inhibitors:  
propanil, pyridate, pyridafol, benzothiadiazinones,  
dinitrophenols, dipyridylenes, ureas, phenols,  
chloridazon, triazines, triazinones, uracils or  
biscarbamates;

30 C13 synergists:  
oxiranes;

C14 growth substances:  
aryloxyalkanoic acids, benzoic acids or  
35 quinolinecarboxylic acids;

C15 cell wall synthesis inhibitors:

40 C16 various other herbicides:

dichloropropionic acids, dihydrobenzofurans, phenylacetic acids or aziprotryn, barban, bensulide, benzthiazuron, benzofluor, buminafos, buthidazole, buturon, cafenstrole, chlorbufam, chlorfenprop-methyl, chloroxuron, cinmethylin, cumyluron, cycluron, cyprazine, cyprazole, dibenzyluron, dipropetryn, dyuron, eglinazin-ethyl, endothall, ethiozin, flucabazole, fluorbentranil, flupoxam, isocarbamid, isopropalin, karbutilate, mefluidide, monuron, napropamide, napropanilide, nitralin, oxaciclomefone, phenisopham, piperophos, procyazine, profluralin, pyributicarb, secbumeton, sulfallate (CDEC), terbucarb, triazofenamide, triaziflam or trimeturon;

15 or their environmentally compatible salts.

12. A synergistic herbicidal mixture as claimed in claims 1 or 10, comprising, as component C), at least one herbicidal compound from the groups C1 to C16:

20 C1 acetyl-CoA carboxylase inhibitors (ACC):

- cyclohexenone oxime ethers:  
alloxydim, clethodim, cloprooxydim, cycloxydim,  
sethoxydim, tralkoxydim, butroxydim, clefoxydim or  
tepraloxydim;

25 phenoxypyenoxypropionic esters:  
clodinafop-propargyl (and, if appropriate,  
cloquintocet), cyhalofop-butyl, diclofop-methyl,  
fenoxaprop-ethyl, fenoxaprop-P-ethyl,  
fenthiapropethyl, fluazifop-butyl, fluazifop-P-butyl,  
30 haloxyfop-ethoxyethyl, haloxyfop-methyl, haloxyfop-P-  
methyl, isoxapryifop, propaquizafop, quizalofop-  
ethyl, quizalofop-P-ethyl or quizalofop-tefuryl; or  
- arylaminopropionic acids:

35 flamprop-methyl or flamprop-isopropyl;

C2 acetolactate synthase inhibitors (ALS):

- imidazolinones:  
imazapyr, imazaquin, imazamethabenz-methyl (imazame),  
40 imazamoc, imazapic, imazethapyr or imazamethapyr;

- pyrimidyl ethers:  
pyrithiobac-acid, pyrithiobac-sodium, bispyribac-sodium, KIH-6127 or pyribenzoxym;
- sulfonamides:  
florasulam, flumetsulam or metosulam; or
- sulfonylureas:  
amidosulfuron, azimsulfuron, bensulfuron-methyl, chlorimuron-ethyl, chlorsulfuron, cinosulfuron, cyclosulfamuron, ethametsulfuron-methyl, ethoxysulfuron, flazasulfuron, halosulfuron-methyl, imazosulfuron, metsulfuron-methyl, nicosulfuron, primisulfuron-methyl, prosulfuron, pyrazosulfuron-ethyl, rimsulfuron, sulfometuron-methyl, thifensulfuron-methyl, triasulfuron, tribenuron-methyl, triflusulfuron-methyl, N-[[[4-methoxy-6-(trifluoromethyl)-1,3,5-triazin-2-yl]amino]-carbonyl]-2-(trifluoromethyl)-benzenesulfonamide, sulfosulfuron or iodosulfuron;

20           C3    amides:

- allidochlor (CDAA), benzoylprop-ethyl, bromobutide, chlorthiamid, diphenamid, etobenzanid (benzchlomet), fluthiamide, fosamin or monalide;

25           C4    auxin herbicides:

- pyridine carboxylic acids:
- clopyralid or picloram; or
- 2,4-D or benazolin;

30           C5    auxin transport inhibitors:

- naptalamide or diflufenzopyr;

C6    carotenoid biosynthesis inhibitors:

- benzofenap, clomazone (dimethazone), diflufenican, fluorochloridone, fluridone, pyrazolynate, pyrazoxyfen, isoxaflutole, isoxachlortole, mesotrione, sulcotrione (chlormesulone), ketospiradox, flurtamone, norflurazon or amitrol;

C7 enolpyruvylshikimate-3-phosphate synthase inhibitors  
(EPSPS):

- glyphosate or sulfosate;

5 C8 glutamine synthetase inhibitors:

- bilanafos (bialaphos) or glufosinate-ammonium;

C9 lipid biosynthesis inhibitors:

- anilides:

10 anilofos or mefenacet;

- chloroacetanilides:

dimethenamid, S-dimethenamid, acetochlor, alachlor,  
butachlor, butenachlor, diethyl-ethyl,  
dimethachlor, metazachlor, metolachlor, S-  
15 metolachlor, pretilachlor, propachlor, prynachlor,  
terbuchlor, thenylchlor or xylachlor;

- thioureas:

butylate, cycloate, di-allate, dimepiperate, EPTC,  
esprocarb, molinate, pebulate, prosulfocarb,  
20 thiobencarb (benthiocarb), tri-allate or vernolate;

or

- benfuresate or perfluidone;

C10 mitosis inhibitors:

- carbamates:

25 asulam, carbetamid, chlorpropham, orbencarb, pronamid  
(propyzamid), prophan or tiocarbazil;

- dinitroanilines:

benefin, butralin, dinitramin, ethalfluralin,  
30 fluchloralin, oryzalin, pendimethalin, prodiamine or  
trifluralin;

- pyridines:

dithiopyr or thiazopyr; or

- butamifos, chlorthal-dimethyl (DCPA) or maleic  
35 hydrazide;

C11 protoporphyrinogen IX oxidase inhibitors:

- diphenyl ethers:

40 acifluorfen, acifluorfen-sodium, aclonifen, bifenox,  
chlornitrofen (CNP), ethoxyfen, fluorodifen,

fluoroglycofen-ethyl, fomesafen, furyloxyfen,  
lactofen, nitrofen, nitrofluorfen or oxyfluorfen;  
- oxadiazoles:  
oxadiargyl or oxadiazon;  
5 - cyclic imides:  
azafenidin, butafenacil, carfentrazone-ethyl,  
cinidon-ethyl, flumiclorac-pentyl, flumioxazin,  
flumipropyn, flupropacil, fluthiacet-methyl,  
sulfentrazone or thidiazimin; or  
10 - pyrazoles:  
ET-751, JV 485 or nipyrapclofen;

C12 photosynthesis inhibitors:

- propanil, pyridate or pyridafol;  
15 - benzothiadiazinones:  
bentazone;  
- dinitrophenols:  
bromofenoxyim, dinoseb, dinoseb-acetate, dinoterb or  
DNOC;  
20 - dipyridylenes:  
cyperquat-chloride, difenzoquat-methylsulfate, diquat  
or paraquat-dichloride;  
- ureas:  
chlorbromuron, chlorotoluron, difenoxuron, dimefuron,  
25 diuron, ethidimuron, fenuron, fluometuron,  
isoproturon, isouren, linuron, methabenzthiazuron,  
methazole, metobenzuron, metoxuron, monolinuron,  
neburon, siduron or tebuthiuron;  
- phenols:  
30 bromoxynil or ioxynil;  
- chloridazon;  
- triazines:  
ametryn, atrazine, cyanazine, desmetryn,  
dimethamethrynn, hexazinone, prometon, prometryn,  
35 propazine, simazine, simetryn, terbumeton, terbutrynn,  
terbutylazine or trietazine;  
- triazinones:  
metamitron or metribuzine;  
- uracils:  
40 bromacil, lenacil or terbacil; or

- **biscarbamates:**  
desmedipham or phenmedipham;

C13 synergists:

5

- **oxiranes:**  
tridiphane;

C14 growth substances:

- **aryloxyalkanoic acids:**  
2,4-DB, clomeprop, dichlorprop, dichlorprop-P (2,4-DP-P), fluoroxypyrr, MCPA, MCPB, mecoprop, mecoprop-P, or triclopyr;
- **benzoic acids:**  
chloramben or dicamba; or
- **quinolinecarboxylic acids:**  
quinclorac or quinmerac;

C15 cell wall synthesis inhibitors:

- isoxaben or dichlobenil;

20 C16 various other herbicides:

- **dichloropropionic acids:**  
dalapon;
- **dihydrobenzofurans:**  
ethofumesate;
- **phenylacetic acids:**  
chlorfenac (fenac); or
- aziprotryn, barban, bensulide, benzthiazuron, benzo-fluor, buminafos, buthidazole, buturon, cafenstrole, chlorbufam, chlorfenprop-methyl, chloroxuron, cin-methylin, cumyluron, cycluron, cyprazine, cyprazole, dibenzyluron, dipropetryn, dymron, eglinazin-ethyl, endothall, ethiozin, flucabazole, fluorbentranil, flupoxam, isocarbamid, isopropalin, karbutilate, mefluidide, monuron, napropamide, napropanilide, nitralin, oxaciiclomefone, phenisopham, piperophos, procyzaine, profluralin, pyributicarb, sebumeton, sulfallate (CDEC), terbucarb, triazofenamid, triaziflan or trimeturon;

or their environmentally compatible salts.

13. A synergistic herbicidal mixture as claimed in 10,  
comprising, as component C), at least one herbicidal compound  
5 from the groups C2, C6 or C 12 as defined in claim 12.

14. A synergistic herbicidal mixture as claimed in claim 10  
comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-  
10 zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-  
pyrazole, as component B) the compound of formula II and as  
component C) a herbicidal compound from the group C2.

15. A synergistic herbicidal mixture as claimed in claim 10  
comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-  
15 zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-  
pyrazole, as component B) the compound of formula II and as  
component C) a herbicidal compound from the group C6.

16. A synergistic herbicidal mixture as claimed in claim 10  
20 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-  
zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-  
pyrazole, as component B) the compound of formula II and as  
component C) isoxaflutole.

25 17. A synergistic herbicidal mixture as claimed in claim 10  
comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-  
zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-  
pyrazole, as component B) the compound of formula II and as  
component C) a herbicidal compound from the group C12.

30 18. A synergistic herbicidal mixture as claimed in claim 10  
comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-  
zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-  
pyrazole, as component B) the compound of formula II and as  
35 component C) a triazine from group C12 as defined in claim  
12.

40 19. A synergistic herbicidal mixture as claimed in claim 8,  
comprising as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-  
zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-

pyrazole, as component B) the compound of formula II and as component C) atrazine.

20. A synergistic herbicidal mixture as claimed in claim 8,  
5 comprising as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-  
zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-  
pyrazole, as component B) the compound of formula II and as  
component C) bentazone.

10 21. A synergistic herbicidal mixture as claimed in claim 8,  
comprising as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-  
zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-  
pyrazole, as component B) the compound of formula II and as  
component C) pyridate.

15 22. A synergistic herbicidal mixture as claimed in any of claims  
1 to 7, comprising, at least three active ingredients, a 3-  
heterocyclyl-substituted benzoyl derivative of the formula I  
(component A) as claimed in claims 1 to 7, the compound of  
20 formula II (component B) and

D) a safener effective amount of at least one safener  
selected from the group of isoxadifen, mefenpyr and  
fenchlorazol.

25 23. A synergistic herbicidal mixture as claimed in any of claims  
1 to 7, comprising, at least three active ingredients, a 3-  
heterocyclyl-substituted benzoyl derivative of the formula I  
(component A) as claimed in claims 1 to 7, the compound of  
30 formula II (component B) and

C) at least one herbicidal compound from the group of the  
acetyl-CoA carboxylase inhibitors (ACC), acetolactate  
synthase inhibitors (ALS), amides, auxin herbicides,  
auxin transport inhibitors, carotenoid biosynthesis  
35 inhibitors, enolpyruvylshikimate 3-phosphate synthase  
inhibitors (EPSPS), glutamine synthetase inhibitors,  
lipid biosynthesis inhibitors, mitosis inhibitors,  
protoporphyrinogen IX oxidase inhibitors, photosynthesis  
inhibitors, synergists, growth substances, cell wall  
40

biosynthesis inhibitors and a variety of other herbicides; and

D) a safener effective amount of at least one safener selected from the group of isoxadifen, mefenpyr and fenchlorazol.

5 24. Synergistic herbicidal mixture as claimed in any of claims 1 to 23, wherein component A) and B) are present in a weight ratio of 1:0.001 to 1:500.

10 25. Synergistic herbicidal mixture as claimed in any of claims 10 to 24, wherein component A), and component C) are present in a weight ratio of 1:0.002 to 1:800.

15 26. Synergistic herbicidal mixture as claimed in any of claims 10 to 25, wherein component A) and component D) are present in a weight ratio of 1:0.002 to 1:800.

20 27. A herbicidal composition comprising a herbicidally active amount of a synergistic herbicidal mixture as claimed in any of claims 1 to 26, at least one inert liquid and/or solid carrier and, if desired, at least one surfactant.

25 28. A process for the preparation of herbicidal compositions as claimed in claim 27, wherein component A), component B), if desired, component C), if desired, component D), at least one inert liquid and/or solid carrier and, if appropriate, a surfactant are mixed.

30 29. A method of controlling undesired vegetation, which comprises applying a synergistic herbicidal mixture as claimed in any of claims 1 to 26 before, during and/or after the emergence of undesired plants, it being possible for the herbicidally active compounds of components A), B), if desired, C) and, if desired, D) to be applied simultaneously or in succession.

35 30. A method of controlling undesired vegetation as claimed in claim 29, wherein the leaves of the crop plants and of the undesired plants are treated.

40